IPC Series

PANEL-PC 955S Series
Fanless, Atom N2600 1.60GHz

User's Manual

CONTEC CO.,LTD.

Check Your Package

Thank you for purchasing the CONTEC product.

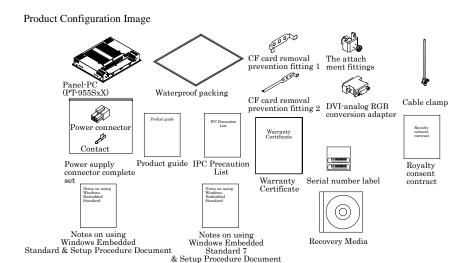The product consists of the items listed below.

Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.

Product Configuration List

Name	PT-955SLX			PT-955SHX		
	-DC6000	-DC6311	-DC6312	-DC6000	-DC6311	-DC6312
	[12.1 inches model]			[15 inches model]		
	Base model	OS-installed model		Base model	OS-installed model	
		[WES2009] Japanese	[WES7] Japanese		[WES2009] Japanese	[WES7] Japanese
	Pcs.	Pcs.	Pcs.	Pcs.	Pcs.	Pcs.
Panel-PC	1	1	1	1	1	1
Waterproof packing (for PT-955SLX)	1	1	1	None	None	None
Waterproof packing (for PT-955SHX)	None	None	None	1	1	1
CFast card removal prevention fitting 1	1	1*1	1*1	1	1*1	1*1
CFast card removal prevention fitting 2	1	1	1	1	1	1
The attachment fittings	8	8	8	10	10	10
Power supply connector complete set						
Power connector	1	1	1	1	1	1
Contact	4	4	4	4	4	4
Cable clamp	1	1	1	1	1	1
DVI-analog RGB conversion adapter	1	1	1	1	1	1
Product guide (this sheet)	1	1	1	1	1	1
IPC Precaution List	1	1	1	1	1	1
Warranty Certificate	1	1	1	1	1	1
Serial number label	1	1	1	1	1	1
Royalty consent contract	None	1	1	None	1	1
Notes on using Windows Embedded Standard	None	1	None	None	1	None
Notes on using Windows Embedded Standard 7	None	None	1	None	None	1
Recovery Media	None	1	1	None	1	1

*1 It is attached to the main body.

Product Configuration Image

CF card removal prevention fitting 1

The attach ment fittings

Panel-PC (PT-955SxX)

Waterproof packing

CF card removal prevention fitting 2

DVI-analog RGB conversion adapter

Cable clamp

Power connector

Contact

Power supply connector complete set

Product guide

IPC Precaution List

Warranty Certificate

Serial number label

Royalty consent contract

Product guide

IPC Precaution List

Warranty Certificate

Notes on using Windows Embedded Standard

Notes on using Windows Embedded Standard

Notes on using Windows Embedded Standard & Setup Procedure Document

Notes on using Windows Embedded Standard 7 & Setup Procedure Document

Recovery Media

*   See the Product Configuration List to check if all the components are included for the specified number of units.

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Table of Contents

5. BIOS SETUP 33

1. Introduction

About the Product

This product is a fanless Panel-PC that is equipped with an Intel® Atom N2600 1.6GHz, energy-saving, dual core processor. This product uses a long-life and energy-saving LED backlight and Atom processor as well as CFast cards for data storage. This product has achieved low power consumption while still providing sufficient performance. Also, this product uses a 5-wire resistive film touch panel, which has improved durability.

This product can be used in a variety of applications as the controller such as operation terminals located in manufacturing lines, distribution systems, and other parts of factories.

This product is the successor to our conventional product, the PT-955 Series, and has achieved high calculation capabilities such as an improved CPU processing capability that is approximately twice that of its predecessor. In addition, this product contributes to the promotion of energy conserving initiatives by providing benefits such as a remarkable increase in data reading and writing speed and a reduction of approximately 15% in power consumption. Due to its installation compatibility, this product can easily be replaced with existing systems that used the PT-955 Series.

This product is available in the following 6 models:

12.1 inches panel mount type, LCD(XGA), Atom N2600 1.6GHz, Memory 2GB
- PT-955SLX-DC6000 (without OS, CFast)
- PT-955SLX-DC6311 (Windows Embedded Standard 2009(Japanese version), CFast 4GB)
- PT-955SLX-DC6312 (Windows Embedded Standard 7(Japanese version), CFast 8GB)

15 inches panel mount type, LCD(XGA), Atom N2600 1.6GHz, Memory 2GB
- PT-955SHX-DC6000 (without OS, CFast)
- PT-955SHX-DC6311 (Windows Embedded Standard 2009(Japanese version), CFast 4GB)
- PT-955SHX-DC6312 (Windows Embedded Standard 7(Japanese version), CFast 8GB)
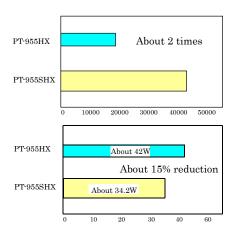
Features

- Approximately twice the CPU calculation capability together with high-speed storage
By using an Intel® Atom N2600, this product has achieved high calculation capabilities. For example, the CPU processing capability is approximately twice*1 that of our conventional product, the PT-955LX. In addition, the use of CFast cards has remarkably improved the speed of data reading and writing.

- Enables reductions in power consumption of approximately 15%
While this product possesses greatly improved CPU and graphical performance, its power consumption is approximately 15% lower*2 than our conventional product, the PT-955HX. This product contributes to the promotion of energy conserving initiatives by only requiring a low power consumption of approximately 43W even under a high load while still maintaining sufficient performance.

Improved durability due to its 5-wire resistive film touch panel
This product uses a 5-wire resistive film touch panel that has excellent durability, which provides a long operating lifetime. Compared to our conventional product, the PT-955 Series, the number of operations has increased from 10 million to 36 million*3.

- Slitless/fanless design that reduces maintenance work

This product's spindleless design eliminates the heat dissipating slit and CPU fan and adopts CFast card for the storage. It is free from dusts and foreign objects, and the use the parts that degrades over the years is avoided in most case, resulting in drastic alleviation of the maintenance burden.

- Major types of peripherals are supported with rich interfaces including the two CFast card slots

It has a variety of extended interface such as 1000BASE-T x 2, USB2.0 x 4, serial (RS-232C) x 2.
It has 2 CFast card slots that can use for OS and data. They are very useful because you can use one slot for system start-up and the other for maintenance, system log, or taking away the collected data.

- Falling-off prevention tools and cable clamps provided to avoid trouble caused by disconnected cable

This product stays trouble-free, being equipped with USB removal prevention fitting and cable clamp for connectors with no locking mechanism, such as USB cable, and with hardware to properly mount and avoid falling out of CFast card.

- Safety design required for embedded applications

Retention of CMOS data by EEPROM allows the system to start up even when the battery has run out. For Windows Embedded Standard installed model, it is possible to use the EWF*3 function of OS. It is designed for safety required for embedding purpose, for example, prohibiting unwanted writing to the CF card with EWF function will relieve the concern about the writing limits to the CF card and prevent an unintentional system alteration.

*1   This is a comparison of actual measured values performed in CONTEC's environment on a Windows Embedded Standard 7 model with the CrystalMark 2004R3 benchmark software.

*2   This is the median between the power consumption with no load and one with maximum load when using a 12VDC input power supply.

*3   This value has been tested by mechanical touching under 300g of force at a rate of two presses per second.

*4   EWF (Enhanced Write Filter) is a function specific to Windows Embedded Standard that protects the disk from being actually written by redirecting the writing to RAM.

Supported OS
- Windows® Embedded Standard 2009 32bit Japanese
- Windows® Embedded Standard 7 32bit Japanese

Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

Web Site

Japanese	http://www.contec.co.jp/
English	http://www.contec.com/
Chinese	http://www.contec.com.cn/

Latest product information

CONTEC provides up-to-date information on products.
CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information

Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited One-Year Warranty

CONTEC products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original products. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Caution on the PT-955SxX Series

Handling Precautions

⚠ WARNING

- Always check that the power supply is turned off before connecting or disconnecting power cables.
- Procedures that could result in serious injury or loss of human life should never be performed from a touch panel. Use system design methods that can guard against input errors.
- Do not modify the product.
- Always turn off the power before inserting or removing circuit boards or cables.
- This product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If using this product in applications where safety is critical such as in railways, automotive, or disaster prevention or security systems, please contact your retailer.
- Do not attempt to replace the battery as inappropriate battery replacement poses a risk of explosion.
- For battery replacement, contact your retailer as it must be performed as a process of repair.
- When disposing of a used battery, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

⚠ CAUTION

- Do not use or store this product in a location exposed to high or low temperature that exceeds range of specification or susceptible to rapid temperature changes.
  Example: - Exposure to direct sun
                    - In the vicinity of a heat source
- Do not use this product in extremely humid or dusty locations. It is extremely dangerous to use this product with its interior penetrated by water or any other fluid or conductive dust. If this product must be used in such an environment, install it on a dust-proof control panel, for example.
- Avoid using or storing this product in locations subject to shock or vibration that exceeds range of specification.
- Do not use this product in the vicinity of devices that generate strong magnetic force or noise. Such products will cause this product to malfunction.
- Do not use or store this product in the presence of chemicals.
- To clean this product, wipe it gently with a soft cloth dampened with either water or mild detergent. Do not use chemicals or a volatile solvent, such as benzene or thinner, to prevent pealing or discoloration of the paint.
- This product's case may become hot. To avoid being burned, do not touch that section while this product is in operation or immediately after turning off the power. Avoid installation in a location where people may come into contact with that section.
- CONTEC does not provide any guarantee for the integrity of data on CF.
- Always disconnect the power cable from the receptacle before mounting or removing the expansion board, or before connecting or disconnecting any connector.
- To prevent corruption of files, always shutdown the OS before turning off this product.
- CONTEC reserves the right to refuse to service a product modified by the user.
- In the event of failure or abnormality (foul smells or excessive heat generation), unplug the power cord immediately and contact your retailer.
- To connect with peripherals, use a grounded, shielded cable.
- Do not use any sharp-pointed object such as a mechanical pencil to touch the touch panel. Doing so may scratch the touch panel, resulting in malfunctions.
- Do not subject the touch panel to shock as doing so may break it.
- When the surface or frame of the touch panel has become dirty, wipe it with neutral detergent. Do not wipe the touch panel with thinner, alcohol, ammonia, or a strong chlorinated solvent. Use a protective sheet (available as an option) if the touch panel is used where it can easily collect dust and dirt.
- It is a characteristic of analog touch panels that their resistance may vary with changes to the ambient environment (temperature and humidity) and with their own aging, resulting in the deviation of the detection point. If this is the case, calibrate the touch panel again to re-set calibration data.
- LCD may have a few bright spots that are always on or a few black spots that are always off. Color irregularity may also occur depending on the viewing angle. This however is due to the structural characteristics of the LCD; therefore, it is not a product fault.

- Burn-in on TFT Display
  "Burn-in" may occur if the same display is retained for a long time. Avoid this by periodically switching the display so that the same display is not maintained for a long time.

  * Burn-In : Phenomenon characterized by a TFT display as a result of long-time display of the same screen where a shadow-like trace persists because electric charge remains in the LCD element even after the patterns are changed.
- The CFast card connector doesn't support hot plug. The pulling out opening of the CFast card cannot be done in the state of power supply ON. Please neither pulling out opening of CFast in the state of power supply ON of this product nor come in contact with CFast. This product may malfunction or cause a failure.
- Component Life:
  (1) Battery---The internal calendar clock and CMOS RAM are backed by a Lithium primary battery. The backup time at a temperature of 25°C with the power disconnected is 10 years or more.
  (2) CFast ---The OS-installed model uses a CFast card in the OS storage area.
  The rewritable limit for the NandFlash is 60,000 times or more.
  As a reference value, the rewritable lifetime can be determined by the following calculating formula:
  Rewritable lifetime (number of times) = ((capacity [MB]/management block size [MB]) $\times$ 60,000 times)/(number of management blocks rewritten each time)
  Example:
  If a 4MB file is created on a 4GB CFast card and is rewritten once every 10 seconds:
  Rewritable lifetime = ((3,521/2) $\times$ 60,000)/2 = 52,815,000 (times)
  Operating lifetime = 52,815,000/((60/10) $\times$ 60 $\times$ 24 $\times$ 365) = Approximately 17 (years).
  (3) Touch panel--- The operating lifetime of the touch panel is at least 36 million touches (as tested by mechanical touching under 250g of force at a rate of two presses per second).
  (4) LCD backlight--- Display brightness decreases over time with use.
  The operating lifetime of the backlight is 50,000 hours (the time until the brightness is lowered to 50% of the initial value).
  * Replacement of expendables is handled as a repair (there will be a charge).
  * Component life is not guaranteed value but only referential value.

FCC PART 15 Class A Notice

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

WARNING TO USER

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

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2. System Reference

Specification

Table 2.1. Functional Specification   *< 1 / 2 >*

Model		PT-955SLX-DC6xxx	PT-955SHX-DC6xxx
Assembly type		12.1 inches panel mount type	15 inches panel mount type
CPU		Intel® Atom™ Processor N2600 1.6GHz	
Chip set		Intel® NM10	
BIOS		BIOS (mfd. by AMI)	
Memory		2GB (204pin SO-DIMM Socket x 1), PC3-8500 DDR3 SDRAM	
Graphic	Controller	Intel® GMA3650 (Built in Intel® Atom™ Processor N2600), Multi-monitor function supported *1	
	Video RAM	Main memory shared	
	Video BIOS	64KB(C0000H-CFFFFH)	
LCD type	LCD type	12.1-inch TFT color LCD, XGA(1024 x 768), 260,000 colors	15-inch TFT color LCD, XGA(1024 x 768), 260,000 colors
	Backlight	LED method, The ON/OFF software can control.	
Touch panel *2	Resolution	4096 x 4096 (emulated in 1024 x 768 mode)	
	Detection method	Resistive-film analog type	
	Connection	Internal serial port	
External display output	DVI *3	640 x 480, 800 x 600, 1,024 x 768, 1,280 x 768, 1,280 x 1,024, 1,360 x 768, 1,400 x 1,050, 1,600 x 900, 1,600 x 1,200, 1,920 x 1,080, 1,920 x 1,200 (16,770,000 colors)	
	Analog RGB	640 x 480, 800 x 600, 1,024 x 768, 1,280 x 768, 1,280 x 1,024, 1,360 x 768, 1,400 x 1,050, 1,600 x 900, 1,600 x 1,200, 1,920 x 1,080, 1,920 x 1,200 (16,770,000 colors)	
Audio		HD Audio compliant, LINE OUT x 1, MIC IN x 1	
SATA		Serial ATA 3Gb/s CFast Card 2slot	
LAN*4		Realtek 8111E Controller 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector x 2 (Wake On LAN support)	
USB		USB 2.0-compliant 4 port	
Serial		RS-232C 3 port (one of the ports is used for touch panel), Baud rate: 50 - 115,200bps	
General-purpose I/O		None	
Hardware monitoring		Monitoring CPU temperature, board temperature, power voltage	
Watch dog timer		Software programmable, 255 level (1sec - 255 sec), Causes a reset upon time-out.	
Real-time clock		The real-time clock is accurate within ±3 minutes (at 25°C) per month, Lithium backup battery life : 10 years or more	
Power Management		Power management setup via BIOS, Power On by Ring / Wake On LAN, Supports ACPI Power management	

*1:   A multi-screen display function using the main LCD and an external display. The "Twin" option is, however, not available for a combination with an external DVI-connected display. "Extended desktop" or "Intel ® dual display clone" can be used instead.

*2   The touching error precision is within 1.5% in the 10mm of the outer circumference of the area that can be touched and is within 1% in all other parts of the area.

*3:   Display of the DVI-connected screen becomes active after the Windows starts up.

*4:   Care about ambient temperature when using 1000BASE-T. Refer to "Installation Requirements" in chapter 3 for details.

Table 2.1. Functional Specification < 2 / 2 >

	Model	PT-955SLX-DC6xxx	PT-955SHX-DC6xxx
Interface	External display	1 port (29 pin DVI-I connector), DVI-analog RGB conversion adapter attachment	
	Audio	LINE OUT: φ3.5 Stereo mini jack, Full-scale output level 1.2Vrms (Typ.). MIC IN: φ3.5 Stereo mini jack, Full-scale input level 1.5Vrms (Typ.)	
	CFast card slot	2 slots (CF1/CF2), CF CARD Type I, bootable PT-955SLX-DC6000, PT-955SHX-DC6000： None PT-955SLX -DC6311, PT-955SHX -DC6311：CFast1 is finished mounting CFast (4GB, 1 partition) *5 PT-955SLX -DC6312, PT-955SHX -DC6312：CFast1 is finished mounting CFast (8GB, 1 partition) *5	
	LAN*2	2 port (RJ-45 connector)	
	USB	4 port (A-TYPE connector)	
	RS-232C	2 port (9pin D-SUB connector [male])	
Power supply	Power supply connector	12 - 24VDC *6	
	Input power supply voltage	10.8 - 31.2VDC	
	Current consumption	12VDC: 2.3A(Typ.) 3.2A (Max.) 24VDC: 1.2A(Typ.) 2.0A (Max.)	12VDC: 1.7A(Typ.) 3.0A (Max.) 24VDC: 1.1A(Typ.) 1.6A (Max.)
	External device power supply capacity	CFast card slot : +3.3VDC 1A (500mA per slot), USB port : +5VDC 2A (500mA per slot)	
Waterproofing and dust-proofing		Front part conforming to IP65 (Use the packing supplied.)	
Panel cut dimensions (mm)		303(W) x 243(H)	358(W) x 289(H)
Physical dimensions (mm)		316(W) x 43.8(D) x 256(H) (Storage device isn't included)	373(W) x 47.8(D) x 304(H) (Storage device isn't included)
Weight		About 3.5kg (without mounting bracket) About 3.6kg (without mounting bracket)	About 4.7kg (without mounting bracket) About 4.8kg (without mounting bracket)

*5: The capacity of CFast is a value when 1GB is calculated by 1 billion bytes. The capacity that can be recognized from OS might be displayed fewer than an actual value.

*6: Use a power cable shorter than 3m.

Table 2.2.   Installation Environment Requirements

Model		PT-955SLX-DC6xxx	PT-955SHX-DC6xxx
Operating temperature *7		0 - 50°C (0 - 45°C when using 1000BASE-T)	
Storage temperature		-10 - 60°C	
Operating humidity		10 - 90%RH (No condensation)	
Floating dust particles		Not to be excessive	
Corrosive gas		None	
Noise resistance	Line noise	AC line / ±2kV, Signal line/±1kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)	
	Static electricity resistance	Contact discharge / ±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2), Atmospheric discharge / ±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)	
Vibration resistance	Sweep resistance	10 - 57Hz / semi-amplitude 0.075 mm 57 - 150Hz / 1.0G, 40 min. each in x, y, and z directions (JIS C60028-2-6-compliant, IEC68-2-6-compliant)	
Impact resistance		10G, half-sine shock for 11 ms in x, y, and z directions (JIS C60068-2-27-compliant, IEC68-2-27-compliant)	
Grounding		Class D grounding, SG-FG / continuity	

*7 : For more details on this, please refer to chapter 3, "Installation Requirements".

Display Optical Specifications

Table 2.3.   Display Optical Specifications (PT-955SLX-DC6xxx)

Parameter	Condition			Min.	Typ.
Visual angle (vertical)	CR⊇10	$\phi = 180°$	Display. Monochrome	70deg	80deg
		$\phi = 0°$		70deg	80deg
Visual angle (horizontal)		$\phi = +90°$		70deg	80deg
		$\phi = -90°$		70deg	80deg
Surface brightness (at center)	Display in white			380cd/m²	500cd/m²

Table 2.4.   Display Optical Specifications (PT-955SHX-DC6xxx)

Parameter	Condition			Min.	Typ.
Visual angle (vertical)	CR⊇10	$\phi = 180°$	Display. Monochrome	70deg	60deg
		$\phi = 0°$		70deg	80deg
Visual angle (horizontal)		$\phi = +90°$		50deg	80deg
		$\phi = -90°$		70deg	80deg
Surface brightness (at center)	Display in white			320cd/m²	400cd/m²

*   "Surface brightness" represents a numerical value per display. The expected brightness through a touch panel is about 80% lower than the above value.

Contrast ratio (CR) = $\dfrac{\text{Brightness at screen center with white displayed}}{\text{Brightness at screen center with black displayed}}$
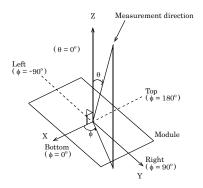
Figure 2.1. Definition of viewable range

⚠ CAUTION

The above optical specification data shows optical characteristics of the liquid crystal in the display; the data does not represent the actual view on the display or its viewing angles.

Power Management Features

- Support both ACPI (Advanced Configuration and Power Interface) and legacy (APM) power management.
- ACPI v4.0 compliant
- Support hardware automatic wake-up

Power Requirements

Your system requires a clean, steady power source for reliable performance of the high frequency CPU on the product, the quality of the power supply is even more important. For the best performance makes sure your power supply provides a range of 10.8 V minimum to 31.2 V maximum DC power source.

Power Consumption

For typical configurations, the CPU card is designed to operate with at least a 60W power supply. The power supply must meet the following requirements :

- Rise time for power supply: 2 ms - 30 ms

The following table lists the power supply's tolerances for DC voltages:
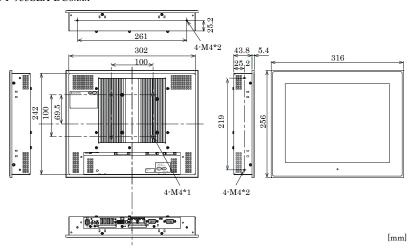
Table 2.5. DC voltage tolerance

DC Voltage	Acceptable Tolerance
+ 12 - 24VDC	+ 10.8 - 31.2VDC
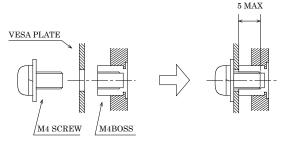
Physical Dimensions

PT-955SLX-DC6xxx

[mm]

*1 : The length (L) from the tip of M4 boss to the M4 screw tip should be 5mm or less.　If not doing so, it may be exactly fixed.

*2 : The length (L) from the surface of the cabinet to the screw tip should be 5mm or less.　If not doing so, it may be damaged.
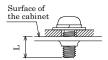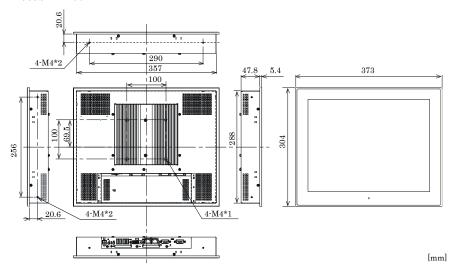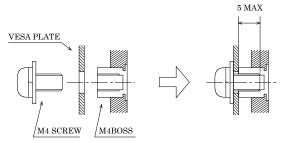
Figure 2.2.　Physical Dimensions (PT-955SLX-DC6xxx)

PT-955SHX-DC6xxx

[mm]

*1 : The length (L) from the tip of M4 boss to the M4 screw tip should be 5mm or less. If not doing so, it may be exactly fixed.

*2 : The length (L) from the surface of the cabinet to the screw tip should be 5mm or less. If not doing so, it may be damaged.
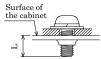
Figure 2.3.   Physical Dimensions (PT-955SHX-DC6xxx)

3. Hardware Setup

Before Using the Product for the First Time

Follow the next steps to set up this product:

STEP1   By referring to the information in this chapter, install, connect and set this product.

STEP2   Connect cables.
Connect the cable of necessary external devices, such as keyboard and a mouse, to this product using appropriate cables.

STEP3   Turn on the power.
After verifying that you have correctly followed steps 1 and 2, turn on the power.
If you find any abnormality after turning on the power, turn it off and check to see if the setup has been performed properly.

STEP4   Set up BIOS.
By referring to Chapter 5, set up BIOS. This setup requires a keyboard.

      *1 Before using this product, be sure to execute "Restore & Defaults" to initialize the BIOS settings to their default values.
(See Chapter 5, "Save & Exit.")

⚠ CAUTION
    Be sure to connect the keyboard and mouse to it before turning the power on for the first time.

Hardware Setup

- Before you start, be sure that the power is turned off.
- Remove only those screws that are explained. Do not move any other screw.

Attaching the CF Attachment Fittings

(1) After inserting a CFast Card, fasten the bundled CFast attachment fittings with a screw.
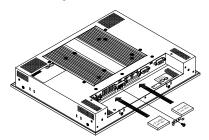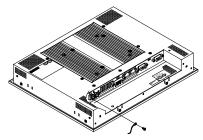
Figure 3.1.   Attaching the CFast Attachment Fittings

⚠ CAUTION
- Insert the CFast Card face up.

- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque.
  The specified tightening torque is 5 - 6kgf·cm.

Attaching the FG

(1) Use screws to attach the FG.

*   Attached screw (M3 x 8)

Figure 3.2.   Attaching the FG

⚠ CAUTION
The FG pin of this product is connected to the GND signal of the DC power connector (DC-IN).
Note that the connection cannot be cut off.
Screw holes may be damaged if screws are tightened with a torque greater than the specified torque.
The specified tightening torque is 5 - 6kgf·cm.

Fastening the Cable

This product comes with clamps for fixing cables.

Fastening the LINEOUT, USB Cable

The system unit has a hole for attaching cable clamp. Using a cable clamp for a cable with lock-less connector, such as the LINEOUT and USB Cable, prevents the connector from being unplugged. Use the cable ties and cable clamps appropriately according to the connecting states and wiring directions of cables.
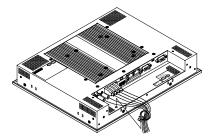
Figure 3.3.   Attaching the cable clamp

Hardware Setup

PT-955SLX-DC6xxx

(1) Cut out a panel according to the following dimensions to mount the main unit.

303$^{+1}_{-0}$

R1 or less

243$^{+1}_{-0}$

Panel thickness range 1.6 - 7mm [mm]
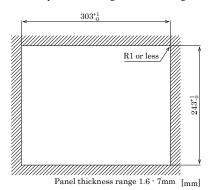
Figure 3.4.   Dimensions of Panel Opening (PT-955SLX-DC6xxx)

(2) Place the waterproof packing in the groove on the front face of the main body and insert the main body into the panel from the external side.

Waterproof packing
(supplied)
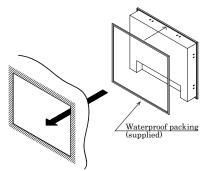
Figure 3.5.   Attaching the waterproof packing (PT-955SLX-DC6xxx)

(3) Hold the attachment fittings from the inside of the panel.

Metal fittings

Panel

Main body

Main body

Overtightning screws may result in damage.
Proper tightening torque for splash-proof is 0.25 - 0.3N•m.
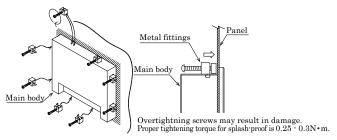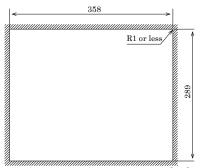
Figure 3.6.   Hardware Setup (PT-955SLX-DC6xxx)

PT-955SHX-DC6xxx

(1) Cut the panel to the following dimensions to attach the main body.

358

289

R1 or less

Panel thickness range 1.6 - 7mm [mm]

Figure 3.7. Panel Opening Dimensions (PT-955SHX-DC6xxx)

(2) Place the waterproof packing in the groove on the front face of the main body and insert the main body into the panel from the external side.

Waterproof packing
(supplied)
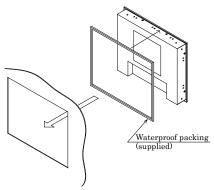
Figure 3.8. Attaching the Attachment Fittings (PT-955SHX-DC6xxx)

(3) Fix the panel and the display in place as shown in the following figure.

- Installation panel with round holes
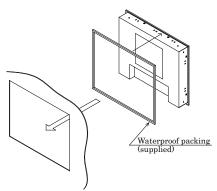
Figure 3.9. Installation method (PT-955SHX-DC6xxx)

When using VESA standard 100mm mounting holes

The main body has mounting holes according to VESA standard 100mm. When using a VESA standard 100mm stand or the like, attach it as shown the following figure.
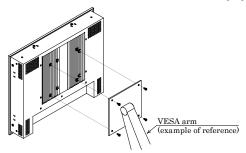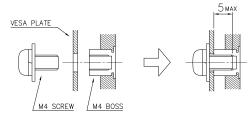
Figure 3.10. Installation of VESA metal fittings

⚠ CAUTION
- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5 - 6kgf·cm.
- This product is not dust-proof or waterproof when attached to a VESA mount.
- The length (L) from the tip of M4 boss to the M4 screw tip should be 5mm or less.   If not doing so, it may be exactly fixed.

Installation Requirements

Be sure that the ambient temperature is within the range specified in the installation environment requirement by making space between the product and device that generates heat or exhaust air.

Installed angle which is recommended

Installed angle of this product which is recommended is -45° - +45°. Except for that, the temperature specification of this product might not be filled.
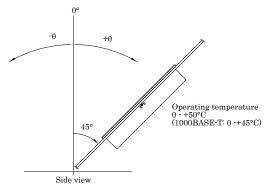
Figure 3.11. Installed angle which is recommended

⚠ CAUTION
Note that even though the ambient temperature is within the specified range, an operational malfunction may occur if there is other device generating high heat; the radiation will influence the product to increase its temperature.

Distances between this product and its vicinity
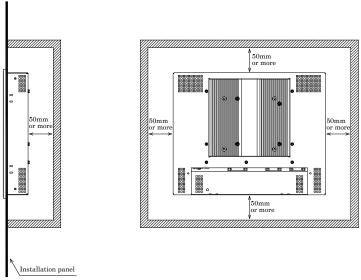
Figure 3.12. Distances between this product and its vicinity

⚠ CAUTION ──

Do not install this product into the fully-sealed space except the case in which the internal temperature is adjustable by equipment such as air conditioner. Troubles such as operational malfunctions could be occurred by the temperature increase caused by long-term usage.

Ambient temperature

In this product, the ambient temperature is decided from the multiple measurement points as shown below. When making use of the product, the air current should be adjusted to prevent that all the temperatures measured at the measurement points exceed the specified temperature.
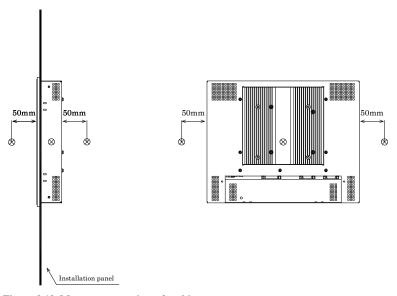
Figure 3.13. Measurement points of ambient temperature

4. Each Component Function

Component Name

Bottom view

PT-955SLX-DC6xxx, PT-955SHX-DC6xxx
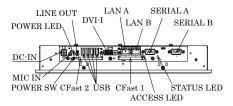
Figure 4.1.   Component Name

Table 4.1.   Component Function

Name	Function
POWER-SW	Power switch
POWER LED	Power ON display LED
ACCESS LED	IDE disk access display LED
STATUS LED	Status LED
DC-IN	DC power input connector
LINE OUT	Line out (ϕ3.5 PHONE JACK)
MIC IN	Mic in (ϕ3.5 PHONE JACK)
LAN A	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
LAN B	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
USB	USB port connector x 4
SERIALA	Serial port A connector (9pin D-SUB/male)
SERIALB	Serial port B connector (9pin D-SUB/male)
DVI-I	Display (29pin female)
CFast1	CFast card slot1
CFast2	CFast card slot2

System Configuration

LINE OUT

SERIAL port (A, B)

LAN port (A, B)

CFast card(1, 2)

Display

USB2.0

USB device such as CD-ROM drive .,etc

Printer
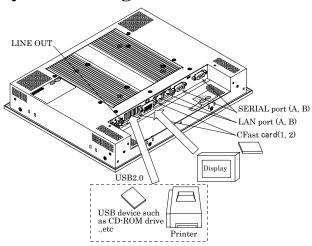
Figure 4.2.   System Configuration

Component Function

LED: POWER, ACCESS, STATUS

There are 3 LED in front of this product.

Table 4.2.　Display Contents of LED

LED name	State	Display contents
POWER LED	OFF	Indicates that this product is switched off.
	ON (Green)	Indicates that this product is switched on.
ACCESS LED	ON (Orange)	Indicates that the IDE device is being accessed.
STATUS LED	OFF	You can control the behavior of LED from the user application. *1
	Flashing, ON (Red)	You can control the behavior of LED from the user application. *1

*1　See Chapter 6, "Appendix."

DC Power Input Connector : DC-IN

To supply the power, always use the power supply listed below.

Rated input voltage 　　　: 12 - 24VDC
Range of input voltage 　: 10.8 - 31.2VDC

Power capacity (PT-955SLX-DC6xxx) : 12V 4.0A or more, 24V 2.0A or more

Power capacity (PT-955SHX-DC6xxx) : 12V 4.0A or more, 24V 2.0A or more

Table 4.3.　DC Power Connector

Connector type	9360-04P(mfd. by ALEX)	
	Pin No.	Signal name
	1	GND
	2	GND
	3	12 - 24V
	4	12 - 24V

Applicable connector on the cable side

Housing 　　: 9357-04(mfd. by ALEX) or 5557-04R (mfd. by MOLEX)
Contact 　　 : 4256T2-LF(AWG18-24) (mfd. by ALEX) or 5556 (AWG18-24) (mfd. by MOLEX)

Rise Time of Power Supply
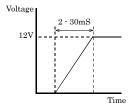
Figure 4.3.　Graph of Rise Time of Power Supply

Power switch: POWER SW

POWER SW is provided.

Line out Interface: LINE OUT

A line output connector is provided. You can plug a headphone or amplifier-integrated speakers into this connector.

Mic in Interface: MIC

A MIC input connector is provided. You can plug a microphone to this connector for sound input.

Audio driver

The audio driver is required to use the microphone input and line output interfaces.

Giga bit-Ethernet : LAN A – B

This product is equipped with 2 ports for giga bit.

- Network type : 1000BASE-T/100BASE-TX/10BASE-T
- Transmission speed * : 1000M/100M/10M bps
- Max. network path length : 100m/segment
- Controller : Realtek 8111E (LAN/B)

Table 4.4.   Giga bit-Ethernet Connector

Pin No.	Function	
	100BASE-TX	1000BASE-T
1	TX+	TRD+(0)
2	TX-	TRD-(0)
3	RX+	TRD+(1)
4	N.C.	TRD+(2)
5	N.C.	TRD-(2)
6	RX-	TRD-(1)
7	N.C.	TRD+(3)
8	N.C.	TRD-(3)

LEDs for display of network statuses:

Right LED : Link LED
Normal connection : Green ON, Operation : Green Blinking
Left LED : Operation LED
10M: Off, 100M : Green, 1000M : Orange

⚠ CAUTION
- Attention should to be paid to the guaranteed operating range of temperature in using 1000BASE-T. For more details on this, refer to chapter3, Installation Requirements. Note that the Ethernet should be configured as 100BASE-TX or 10BASE-T in using under the temperature 0 - 50°C.
- If you are using an operating system other than that of the preinstalled model, LAN-1 and LAN-2 may not be assigned to the silkscreen-printed "LAN-A" and "LAN-B."
- If you are using the Wake On LAN function, set the OS driver setting "Wake on Magic Pocket" to "Enabled." Also, enable WOL on the BIOS setup screen (see chapter 5, "Advanced - ACPI Settings" for details).

USB Ports: USB

This product is equipped with 4 port for USB 2.0 interface.

Table 4.5. USB Connector

	Pin No.	Function
	1	USB_VCC
	2	USB-
	3	USB+
	4	USB_GND

Serial Port Interface: SERIAL A - B

SERIAL A,B (RS-232C Ports)

The product has 2 ports of RS-232C compliant serial ports supporting up to a baud rate of 115,200bps with a 16-byte transmission-dedicated data buffer and a 16-byte reception-dedicated data buffer. You can use "Chapter 5 BIOS Setup" to configure an I/O address, interrupt and unused state for each of the ports independently. (The same I/O address and IRQ cannot be shared with any other device.)
Please refer to "Chapter 6 I/O Port Addresses" for more information on I/O address and register function.

Table 4.6. SERIAL A, B, C, D, E I/O Addresses and Interrupts

SERIAL	I/O address	Interrupt
A	3F8h - 3FFh	IRQ 4
B	2F8h - 2FFh	IRQ 3

Table 4.7. Serial Port Connector

Connector used on the product	9-pin D-SUB (MALE)

Pin No.	Signal name	Meaning	Direction
1	CD	Carrier detect	Input
2	RD	Received data	Input
3	TD	Transmitted data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	-----
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

DVI Interface: DVI

A DVI interface is provided. You can use it to connect a CRT (even a D-SUB 15 pin connector is acceptable by using the bundled DVI-analog RGB adapter) or a CONTEC Panel Link display. The connector is named DVI (DVI-I 29-pin connector).

⚠ CAUTION

Precautions when Using Additional Display

- An additional display can be used to enable simultaneous screen display with the PANEL-PC main display.

- If the resolution of the additional display is different from that of the PANEL-PC main display, the size of screen images on the additional display will be decreased or increased with lower image quality.

- When using the main unit and touch panel function at the same time, use a USB connection for the touch panel.

Table 4.8. DVI Connector

Connector used on the product	DVI-I 29 pin				

Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	DATA2-	13	N.C.	C1	RED
2	DATA2+	14	+5V	C2	GREEN
3	DATA2 SHIELD	15	GND	C3	BLUE
4	N.C.	16	HPD	C4	HSYNC
5	N.C.	17	DATA0-	C5	GND
6	DDC CLK	18	DATA0+		
7	DDC DATA	19	DATA0 SHIELD		
8	VSYNC	20	N.C.		
9	DATA1-	21	N.C.		
10	DATA1+	22	DATA0 SHIELD		
11	DATA1 SHIELD	23	CLK+		
12	N.C.	24	CLK-		
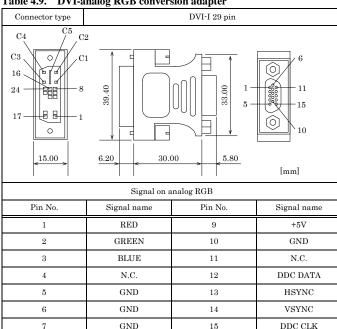
Table 4.9. DVI-analog RGB conversion adapter

Connector type	DVI-I 29 pin		

[mm]

Signal on analog RGB			
Pin No.	Signal name	Pin No.	Signal name
1	RED	9	+5V
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	DDC DATA
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDC CLK
8	GND		

For the LCDs that can be connected, please refer to "Chapter 7 List of Options".

Display driver

Install the appropriate display driver for your OS from the CONTEC's Web site [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's Web site.)

⚠ CAUTION ─────────────────────────

When the analog display is used, Windows MS-DOS may not be properly displayed in full-screen mode.
This is because the frequency and resolution of Windows and MS-DOS (full-screen display) are the same due to the screen settings while the display parameters are different.
For display, as only one parameter can be stored for one frequency or resolution, only either of Windows or MS-DOS screen can be displayed properly.
In this case, change the resolution or display frequency of Windows so that it is not the same as for the MS-DOS display.
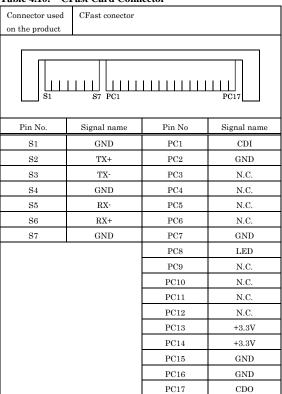
CFast Card Connector (Primary IDE Connection): CFast1 - 2

The CFast Card (Type I : dedicated to the memory card) can be connected.
The CFast card connector doesn't support hot plug. The pulling out opening of the CFast card cannot be done in the state of power supply ON. Please neither pulling out opening of CFast in the state of power supply ON of this product nor come in contact with CFast. This product may malfunction or cause a failure. Before you insert/remove the CFast card, make sure that the power is switched off and the access LED is turned off.

Table 4.10.   CFast Card Connector

Connector used on the product	CFast conector		

S1   S7 PC1   PC17

Pin No.	Signal name	Pin No	Signal name
S1	GND	PC1	CDI
S2	TX+	PC2	GND
S3	TX-	PC3	N.C.
S4	GND	PC4	N.C.
S5	RX-	PC5	N.C.
S6	RX+	PC6	N.C.
S7	GND	PC7	GND
		PC8	LED
		PC9	N.C.
		PC10	N.C.
		PC11	N.C.
		PC12	N.C.
		PC13	+3.3V
		PC14	+3.3V
		PC15	GND
		PC16	GND
		PC17	CDO

5. BIOS Setup

Introduction

This chapter discusses American Megatrends's Setup program built into the FLASH ROM BIOS. The Setup program allows users to modify the basic system configuration. This special information is then stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

The rest of this chapter is intended to guide you through the process of configuring your system using Setup.

Starting Setup

The Award BIOS is immediately activated when you first power on the computer. The BIOS reads the system information contained in the CMOS and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1   By pressing <Del> or <F2> immediately after switching the system on, or

2   Press <Del> or <F2> when the message "Press <DEL> or <F2> to enter setup." is displayed on the screen during POST (Power On Self-Test).

> **`Press <DEL> or <F2> to enter setup.`**

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON. You can also restart the system by pressing <Ctrl>, <Alt>, and <Delete> at the same time.

Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the Page Up and Page Down keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Table 5.1.   Using Setup

Key	Function
Up Arrow	Move to the previous item
Down Arrow	Move to the next item
Left Arrow	Move to the item on the left (menu bar)
Right Arrow	Move to the item on the right (menu bar)
Esc	Main Menu: Quit without saving changes Submenus: Exit Current page to the next higher level menu
Move Enter	Move to the item you desired
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help on Setup navigation keys
F2 key	Load the previous setting value
F3 key	Load the optimized defaults
F4 key	Save all the changed settings to the FLASH ROM and exit

Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> key again.

In Case of Problems

If you cannot boot the computer after using Setup to change and save system settings, the computer will have to be repaired. The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

A Final Note About Setup

The information in this chapter is subject to change without notice.

Main Menu

Once you enter the AMI BIOS CMOS Setup Utility, the Main Menu will appear on the screen. You can move to the tabs of the different items by pressing the right and left arrow keys.

Figure 5.1. Main Manu

Setup Items

You can choose the following tabs.

Main
View the basic system configuration. Also, set the language and the date and time.

Advanced
Set the detailed functions that can be set on the system in use.

Chipset
Specify the settings related to the chipset in use.

Boot
Specify the settings related to how the system will boot.

Security
Set the passwords to protect the security of the system.

Save & Exit
Load/save setup items and exit the setup menu.

Main

View the basic system configuration. This table shows the items that you can set on the Main Menu.

Table 5.2.   Main Menu Selections

Item	General Display	Description
System Date	Month / Day / Year	Set the system date. Note that the 'Day' automatically changes when you set the date
System Time	Hour : Minute : Second	Set the system time

Advanced

Set the detailed functions of the system.
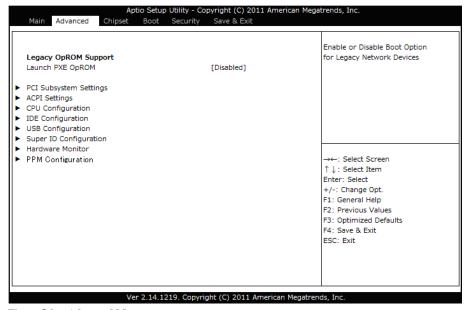
Figure 5.2.   Advanced Menu

This table shows the selections that you can make on the Advanced Menu.

Table 5.3.   Advanced Menu Selections

Item	Options	Description
Launch PXE OpROM	Disabled Enabled	Enable or disable the PXE boot.

The following sub-items are available.

PCI Subsystem Settings
Specify the PCI subsystem settings.

ACPI Settings
Specify the settings for ACPI power management.

CPU Configuration
Specify the CPU settings.

IDE Configuration
Specify the IDE controller settings.

USB Configuration
Specify the USB settings.

Super I/O Configuration
Specify the Super I/O settings.

Hardware Monitor
View the hardware monitor.

PPM Configuration
Specify the settings for the Intel energy-saving function.

PCI Subsystem Settings

Specify the PCI subsystem settings.
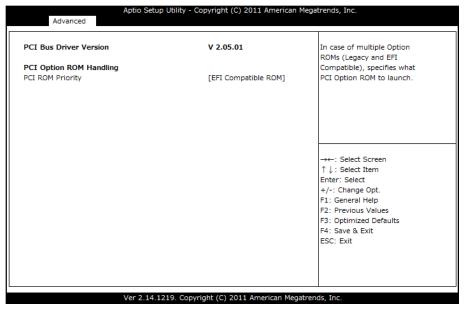
Figure 5.3.   PCI Subsystem Settings

This table shows the selections that you can make on the PCI Subsystem Settings Menu.

Table 5.4.   PCI Subsystem Settings

Item	Options	Description
PCI ROM Priority	Legacy ROM EFI Compatible ROM	If multiple Option ROMs are present, select which Option ROM to launch. Do not change this setting.

ACPI Settings

Specify the settings for ACPI power management.

Figure 5.4.   ACPI Settings

This table shows the selections that you can make on the ACPI Settings Menu.

Table 5.5.   ACPI Settings

Item	Options	Description
ACPI Sleep State	Suspend Disabled S1 (CPU Stop Clock) S3 (Suspend to RAM)	Select the ACPI Sleep State when the system switches to the suspended state. Do not change this setting.
Wakeup by RI Control	Disabled Enabled	Enable or disable the Wakeup by Ring function.*1
Wake On LAN Control	Disabled Enabled	Enable or disable the Wake On LAN function.*1
Resume On RTC Alarm	Disabled Enabled	Enable or disable the function for automatically turning the system on at the specified date and time. When this is enabled, use the following items to set the date and time at which the system will automatically turn on.
RTC Wake up Day	0 - 31	Set the day at which the system will automatically turn on. If this is set to 0, the system will turn on each day.
RTC Wake up Hour	0 - 23	Set the hour at which the system will automatically turn on.
RTC Wake up Minute	0 - 59	Set the minute at which the system will automatically turn on.
RTC Wake up Second	0 – 59	Set the second at which the system will automatically turn on.

*1:   To enable or disable the Wakeup by Ring or Wake On LAN function, you have to shut down the system from the OS.

CPU Configuration

Specify the CPU settings.

Figure 5.5.　CPU Configuration

This table shows the selections that you can make on the CPU Configuration Menu.

Table 5.6.　CPU Configuraiton

Item	Options	Description
Hyper-Threading	Disabled Enabled	Enable or disable the Hyper-Threading function. Normally do not change this setting.
Execute Disable Bit	Disabled Enabled	Enable or disable the Execute Disable function. Do not change this setting.
Limit CPUID Maximum	Disabled Enabled	Enable or disable the CPUID limit. Normally do not change this setting.

IDE Configuration

Figure 5.6.   IDE Configuration

This table shows the selections that you can make on the IDE Configuration Menu.

Table 5.7.   IDE Configuraiton

Item	Options	Description
SATA Controller(s)	Disabled Enabled	Enable or disable the SATA port (for the CFast card). Normally do not change this setting.
Configure SATA as	IDE AHCI	Select the SATA controller operation mode. * If you change the operation mode, you are required to reinstall the OS. Normally do not change this setting.

USB Configuration
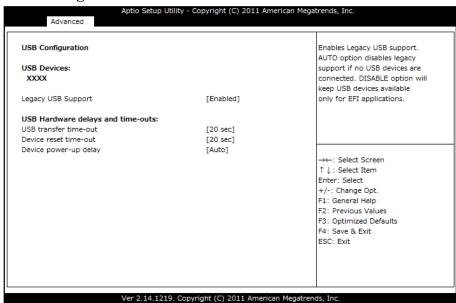
Figure 5.7.   USB Configuration

This table shows the selections that you can make on the USB Configuration Menu.

Table 5.8.   USB Configuraiton

Item	Options	Description
USB Devices：	XXXX	Displays the names of the connected USB devices.
Legacy USB Support	Enabled Disabled Auto	Set the USB keyboard support for operating systems that do not support USB. Normally do not change this setting.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	Set the timeout time for USB data transfers. Normally do not change this setting.
Device reset time-out	10 sec 20 sec 30 sec 40 sec	Set the timeout time when resetting high-capacity USB storage devices. Normally do not change this setting.
Device power-up delay	Auto Manual	Set the standby time for recognizing USB devices. When this is set to Manual, you can use the following item to change the standby time for recognizing USB devices.
Device power-up delay in seconds	1..40	Set the standby time for recognizing USB devices (1 to 40 seconds). When you connect a USB device that requires a certain time to be recognized, such as a DVD drive, you can improve device recognition by increasing the standby time.

Super I/O Configuration
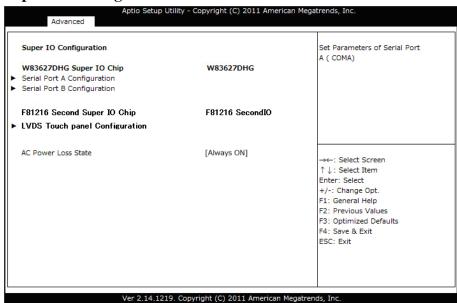
Figure 5.8.   Super I/O Configuration

This table shows the selections that you can make on the Super I/O Configuration Menu.

Table 5.9.   Super I/O Configuration

Item	Options	Description
AC Power Loss State	Always OFF Always ON Last State	Set whether to start the system simultaneously when the power supply starts. Always OFF: Press Power button to start the system. The system does not start when the power supply starts. Always ON: The system starts simultaneously when the power supply starts. Last State: If the power is turned off while the system is on, the next time the power supply starts, the system will start. If the power is turned off while the system is not on, the next time the power supply starts, the system will not start.

The following sub-items are available.

Serial Port x Configuration (x = A..B)

Specify the settings of serial ports A and B.

LVDS Touch panel Configuration
Specify the settings of the touch panel serial port.

Serial Port A Configuration

Figure 5.9.   Serial Port A Configuration

This table shows the selections that you can make on the Serial Port A Configuration Menu.

Table 5.10.   Serial Port A Configuration

Item	Options	Description
Serial Port	Disabled Enabled	Enable or disable serial port A (COM A).
Change Settings	Auto IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,10,11,12;	Set the base address and interrupt of serial port A (COM A). Normally set this to Auto.

Serial Port B Configuration

Figure 5.10.   Serial Port B Configuration

This table shows the selections that you can make on the Serial Port B Configuration Menu.

Table 5.11.   Serial Port B Configuration

Item	Options	Description
Serial Port	Disabled Enabled	Enable or disable serial port B (COM B).
Change Settings	Auto IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,10,11,12;	Set the base address and interrupt of serial port B (COM B). Normally set this to Auto.

LVDS Touch panel Configuration
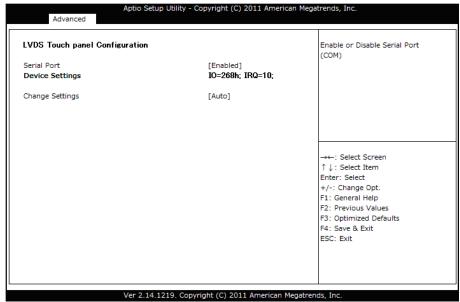
Figure 5.11.   LVDS Touch panel Configuration

This table shows the selections that you can make on the LVDS Touch panel Configuration Menu.

Table 5.12.   LVDS Touch panel Configuration

Item	Options	Description
Serial Port	Disabled Enabled	Enable or disable the internal serial port used by the touch panel.
Change Settings	Auto IO=268h; IRQ=10; IO=3F8h; IRQ=3,4,5,6,7,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,10,11,12;	Set the base address and interrupt of the internal serial port used by the touch panel. Normally set this to Auto.

Hardware Monitor

View the system status such as the CPU, system temperature, and input voltage.

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
┌──────────┐
│ Advanced │
└──────────┘

 PC Health Status

 System Temperature              : XX C
 CPU Temperature                 : XX C
 VCORE                           : +X.XXX V
 +12V                            : +X.XXX V
 + 5V                            : +X.XXX V
 VCC3V                           : +X.XXX V
 +3.3VSB                         : +X.XXX V
 VBAT                            : +X.XXX V

                                            →←: Select Screen
                                            ↑↓: Select Item
                                            Enter: Select
                                            +/-: Change Opt.
                                            F1: General Help
                                            F2: Previous Values
                                            F3: Optimized Defaults
                                            F4: Save & Exit
                                            ESC: Exit

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```

Figure 5.12.   Hardware Monitor

PPM Configuration
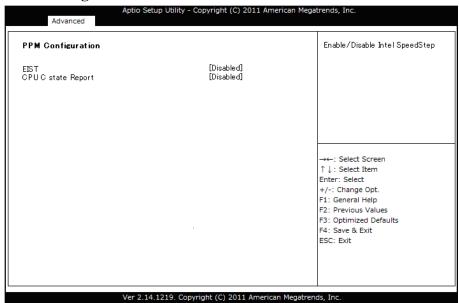
Figure 5.13.   PPM Configuration

This table shows the selections that you can make on the PPM Configuration Menu.

Table 5.13.   PPM Configuration

Item	Options	Description
EIST	Disabled Enabled	Enable or disable the Intel SpeedStep function. When this is set to Enabled, the CPU speed changes to match the load.
CPU C state Report	Disabled Enabled	Enable or disable the Intel energy-saving function (C state).

Chipset

Specify the detailed chipset settings.
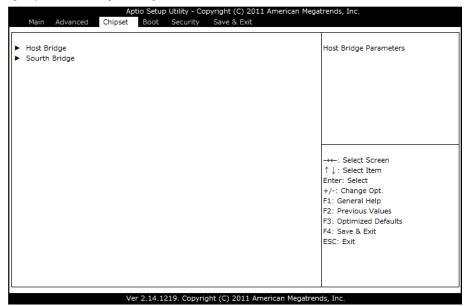
Figure 5.14. Chipset menu

The following sub-items are available.

Host Bridge
Specify the Host Bridge settings.

South Bridge
Specify the South Bridge settings.

Host Bridge
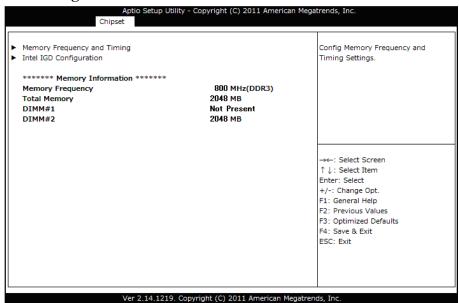
Figure 5.15.　Host Bridge

The following sub-items are available.

Memory Frequency and Timing

Intel IGD Configuration

Memory Frequency and Timing

Figure 5.16.   Memory Frequency and Timing

This table shows the selections that you can make on the Memory Frequency and Timing Menu.

Table 5.14.   Memory Frequency and Timing

Item	Options	Description
MRC Fast Boot	Disabled Enabled	Enable or disable the MRC fast boot. Do not change this setting.
Max TOLUD	Dynamic 1 GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB	Set the maximum TOLUD size. Do not change this setting.

Intel IGD Configuration

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
       Chipset

   Intel IGD Configuration                              Select the Video Device which
                                                        will be activated during POST.
   VBIOS Select for OS              [Win7]
   Boot Display Type               [LVDS]
   LCD Panel Type                  [1024x768 LVDS]
   Color Depth                     [18 Bits]



                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



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```

Figure 5.17.   Intel IGD Configuration

This table shows the selections that you can make on the Intel IGD Configuration Menu.

Table 5.15.   Intel IGD Configuration

Item	Options	Description
VBIOS Select for OS	Win7 Other	Select the VBIOS setting. To use Windows 7, set this to [Win 7], to use another OS, set this to [Other]. * When the BIOS default settings are loaded, this is set to [Win 7]. * After you install the OS, do not change this setting.
Boot Display Type	CRT LVDS DVI CRT + LVDS CRT + DVI DVI + LVDS	Select the display for the BIOS SETUP screen.

* If you select "CRT + LVDS" or "DVI + LVDS," the LVDS will be set as the secondary display.

South Bridge

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Chipset

▶ TPT Devices   Enable/Disable Intel(R) IO
                                                                       Controller Hum (TPT) devices
Onboard LAN A Controller   [Enabled]
Onboard LAN B Controller   [Enabled]

DMI Link ASPM Control   [Enabled]

High Precision Event Timer Configuration
High Precision Timer   [Enabled]

SLP_S4 Assertion Width   [1-2 Seconds]   →←: Select Screen
                                                         ↑↓: Select Item
CPU Thermal Throttling   [Disabled]   Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit

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Figure 5.18.   South Bridge

The items that can be set for the South Bridge are shown in table 5.16.

Table 5.16.   South Bridge

Item	Options	Description
Onboard LAN A Controller	Disabled Enabled	Enable or disable the LAN A controller.
Onboard LAN B Controller	Disabled Enabled	Enable or disable the LAN B controller.
DMI Link ASPM Controll	Disabled Enabled	Enable or disable the ASPM control with the DMI link. Normally do not change this setting.
High Precision Timer	Disabled Enabled	Enable or disable the high precision event timer. Normally do not change this setting.
SLP_S4 Assertion Width	1-2 Seconds 2-3 Seconds 3-4 Seconds 4-5 Seconds	Set the minimum assertion time of the S4 signal. Normally do not change this setting.
CPU Thermal Throttling	Disabled 12.5% 25% 37.5% 50% 62.5% 75% 87.5%	Set the clock reduction rate when the CPU temperature increases.
Threshold Temperature	Disabled 50 C/122 F 55 C/131 F 60 C/140 F 65 C/149 F 70 C/158 F 75 C/167 F 70 C 176 F	Set the temperature at which to start reducing the clock when the CPU temperature increases.

The following sub-items are available.

TPT Devices
Specify the Intel IO Controller Hub (TPT) settings.

TPT Devices
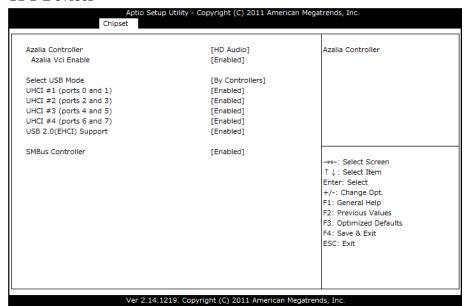
Figure 5.19.   TPT Devices

This table shows the selections that you can make on the TPT Devices Menu.

Table 5.17.   TPT Devices

Item	Options	Description
Azalia Controller	Disabled HD Audio	Enable or disable the Azalia sound controller. Normally do not change this setting.
Azalia Vci Enable	Disabled Enabled	Enable or disable the Azalia Vci. Normally do not change this setting.
Select USB Mode	By Controllers By Ports onry	Select how to specify the USB port to use. Normally do not change this setting. By Controllers: Specify the USB port for each UHCI controller. - External USB port UCCI #3, #4: Internal USB port By Ports Only: Specify the number of ports to use.
UHCI #1 (ports 0 and 1)	Disabled Enabled	(When the USB mode is set to By Controllers) Enable or disable USB ports 0 and 1. Normally do not change this setting.
UHCI #2 (ports 2 and 3)	Disabled Enabled	(When the USB mode is set to By Controllers) Enable or disable USB ports 2 and 3. Normally do not change this setting.

Item	Options	Description
UHCI #3 (ports 4 and 5)	Disabled Enabled	(When the USB mode is set to By Controllers) Enable or disable internal USB ports 4 and 5. Normally do not change this setting.
UHCI #4 (ports 6 and 7)	Disabled Enabled	(When the USB mode is set to By Controllers) Enable or disable internal USB ports 6 and 7. Normally do not change this setting.
USB Function	Disabled 1 USB Ports 2 USB Ports 3 USB Ports 4 USB Ports 5 USB Ports 6 USB Ports 7 USB Ports 8 USB Ports	(When the USB mode is set to By Ports Only) Set the number of enabled USB ports. 1 to 4: External USB ports 5 to 8: Internal USB ports
USB 2.0(EHCI) Support	Disabled Enabled	Enable or disable the USB 2.0 (EHCI) function. Normally do not change this setting.
SMBus Controller	Disabled Enabled	Enable or disable the SMBus controller. Normally do not change this setting.

Boot

Figure 5.20. Boot menu

Specify the settings related to how the system will start. The following items are available.

Table 5.18. Boot

Item	Options	Description
Setup Prompt Timeout	1 - 65535	Set the timeout time (in seconds) after which the system switches to the BIOS setup screen. Set this to 65535 to make the system wait until it receives key input.
Bootup NumLock State	On Off	Set the initial state of the NumLock key on the USB keyboard.
Quiet Boot	Enabled Disabled	Enable or disable the Quiet Boot option. If you set this to Enabled, information will not be displayed, which shortens the time to boot the system.
Option ROM Messages	Force BIOS Keep Current	Set the display of the BIOS message that appears when you connect the Option ROM. Normally do not change this setting.
Interrupt 19 Capture	Disabled Enabled	This setup item does not function on this product. Do not change this setting.
Boot Option #x	XXXXXXXXX (Specify an arbitrary device.)	Set the order of bootable devices that are connected.
CD/DVD ROM Drive BBS Priorities	XXXXXXXXX (Specify an arbitrary device.)	Specify the start order of the connected CD or DVD drives.
Hard Drive BBS Priorities	XXXXXXXXX (Specify an arbitrary device.)	Specify the start order of the connected CFast or USB removable drives.

⚠ CAUTION ───

- In the Boot Option #x list, the same device may be displayed as shown below.
  (1) USB Disk
  (2) UEFI : USB Disk
  In this situation, select (1) to perform legacy booting in which the disk is assumed to be MBR formatted and (2) to perform UEFI booting in which the disk is assumed to be GPT formatted.
  Be sure to specify (1) for the boot setting. Booting with option (2) is not supported.

- Only the devices set with high priorities with the other settings such as CD/DVD ROM Drive BBS Priorities can be selected in the Boot Option #x lists.

Security

Set the system security.
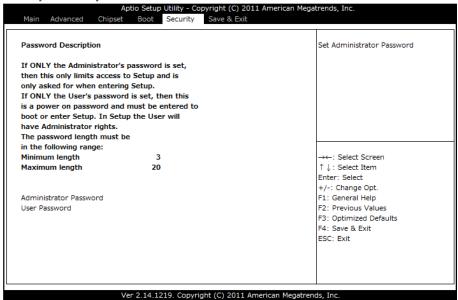
Figure 5.21.   Security menu

The following items are available.

Administrator Password

Press <Enter> key to display the following screen for entering the password.

| Create New Password | [****] |
| Confirm New Password | [****] |

Enter the password twice. The password must be three characters or longer and 20 characters or less in length. To disable the password, enter the Administrator Password entry screen again.

Enter Current Password	[****]
Create New Password	[ ]
Confirm New Password	[ ]
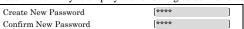
Enter the old password for the first item, and then press <Enter> key without entering the new password to disable the password.

User Password

Press <Enter> key to display the following screen for entering the password.

| Create New Password | [****] |
| Confirm New Password | [****] |

Enter the password twice. The password must be three characters or longer and 20 characters or less in length. To disable the password, enter the Administrator Password entry screen again.

⚠ CAUTION

Be careful to not forget the password. If you forget the password, the product will have to be repaired at an extra cost.

Save & Exit

Load/save setup items and exit the setup menu.
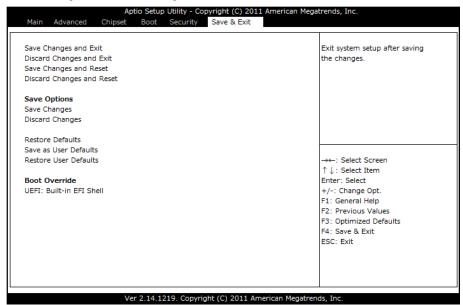
Figure 5.22.   Save & Exit menu

The following items are available.

Save Changes and Exit
Press <Enter> key to display a confirmation dialog box with a message such as that shown below.

Save & Exit Setup
Save configuration and exit?
[Yes]   [No]

Select [Yes] to record the contents that you selected on the menu to the FLASH ROM. Depending on the changed items, the system may restart. The next time that the computer boots, the system will be configured according to the selected contents for Setup that have been stored on the FLASH ROM.
Select [No] to return to the setup menu.

Discard Changes and Exit
Press<Enter> key to display a confirmation dialog box with a message such as that shown below.

Exit Without Saving
Quit without saving?
[Yes]   [No]

Select [Yes] to continue operating the system without recording the contents that you selected on the menu to the FLASH ROM.
Select [No] to return to the setup menu without recording the selected contents to the FLASH ROM.

Save Changes and Reset
Press <Enter> key to display a confirmation dialog box with a message such as that shown below.

Save & Reset
Save configuration and reset?
[Yes]　[No]

Select [Yes] to record the contents that you selected on the menu to the FLASH ROM. The system will then restart. The next time that the computer boots, the system will be configured according to the selected contents for Setup that have been stored on the FLASH ROM.

Select [No] to return to the setup menu.

Discard Changes and Reset
Press <Enter> key to display a confirmation dialog box with a message such as that shown below.

Reset Without Saving
Reset without saving?
[Yes]　[No]

Select [Yes] to restart the system without recording the contents that you selected on the menu to the FLASH ROM. Select [No] to return to the setup menu without recording the selected contents to the FLASH ROM.

Save Changes
Press <Enter> key to display a confirmation dialog box with a message such as that shown below.

Save Setup Values
Save Configuration?
[Yes]　[No]

Select [Yes] to record the contents that you selected on the menu to the FLASH ROM and return to the setup menu.
Select [No] to return to the setup menu.

Discard Changes

Press <Enter> key to display a confirmation dialog box with a message such as that shown below.

Load Previos Values
Load Previous Values?
[Yes]　　[No]

Select [Yes] to discard the contents that you selected on the menu, load previous selected contents recorded to the FLASH ROM, and then return to the setup menu.
Select [No] to return to the setup menu.

Restore Defaults

Press <Enter> key to display a confirmation dialog box with a message such as that shown below.

Load Optimized Defaults
Load Optimized Defaults?
[Yes]　　[No]

Select [Yes] to load the default values of the factory settings to operate the system. Until you save these settings, they will not be reflected in the FLASH ROM.
Select [No] to return to the setup menu without loading the default values.

Save as User Defaults

Press<Enter> key to display a confirmation dialog box with a message such as that shown below.

Save Values as User Defaults
Save Configuration?
[Yes]　　[No]

Select [Yes] to record to the FLASH ROM the current setting values as the user default values and return to the setup menu.
Select [No] to return to the setup menu without loading the default values.

Restore User Defaults

Press <Enter> key to display a confirmation dialog box with a message such as that shown below.

Restore User Defaults
Restore User Defaults?
[Yes]　　[No]

Select [Yes] to load the values set as the user default values and return to the setup menu. Until you save these settings, they will not be reflected in the FLASH ROM.
Select [No] to return to the setup menu.

Boot Override

Position the cursor on the device that you want to start, and then press <Enter> key to boot directly from the selected device regardless of the device start order set on the Boot menu.

6. Appendix

Memory Map

Memory Segments	Comments
00000h - 9FFFh	0 - 640K DOS Region
A0000h - BFFFFh	Video Buffer
B0000h - B7FFFh	Monochrome Adapter range
C0000h - CFFFFh	Video BIOS
D0000h - DFFFFh	Expansion Area
E0000h - EFFFFh	Extended System BIOS Area
F0000h - FFFFFh	System BIOS Area
100000h - FFFFFFFFh	Extended Memory Area
00100000 - Top of Main Memory	Main DRAM Address Range
Top of Main Memory	Extended SMRAM Address Range
Top of Main Memory To 4GB	PCI Memory Address Range
FEC0000h - FECFFFFFh, FEE00000h - FEEFFFFFh	APIC configuration space
FFE0000h - FFFFFFFFh	High BIOS Area

Figure 6.1.   Memory Map

I/O Port Addresses

Table 6.1.　I/O Port Addresses　*< 1 / 2 >*

Address	Size	Description
0000 - 001F	32 bytes	DMA controller
0020 - 0021	2 bytes	Interrupt controller
0024 - 0025	2 bytes	Interrupt controller
0028 - 0029	2 bytes	Interrupt controller
002C – 002D	2 bytes	Interrupt controller
002E – 002F	2 bytes	LPC SIO
0030 – 0031	2 bytes	Interrupt controller
0034 - 0035	2 bytes	Interrupt controller
0038 - 0039	2 bytes	Interrupt controller
003C – 003D	2 bytes	Interrupt controller
0040 - 0043	4 bytes	Timer / Counter
004E – 004F	2 bytes	LPC SIO
0050 - 0053	4 bytes	Timer / Counter
0060	1 byte	Keyboard controller
0061	1 byte	NMI controller
0062	1 byte	Micro controller
0064	1 byte	Keyboard controller
0066	1 byte	Micro controller
0070 - 0077	8 bytes	NMI / Real-time clock controller
0080 – 0091	18 bytes	DMA controller / LPC / PCI
0092	1 byte	Reset generator
0093 – 009F	13 bytes	DMA controller
00A0 – 00A1	2 bytes	Interrupt controller
00A4 – 00A5	2 bytes	Interrupt controller
00A8 – 00A9	2 bytes	Interrupt controller
00AC – 00AD	2 bytes	Interrupt controller
00B0 – 00B1	2 bytes	Interrupt controller
00B2 – 00B3	2 bytes	Power management
00B4 – 00B5	2 bytes	Interrupt controller
00B8 – 00B9	2 bytes	Interrupt controller
00BC – 00BD	2 bytes	Interrupt controller
00C0 – 00DF	32 bytes	DMA controller
00F0	1 byte	Interrupt controller
0170 - 0177	8 bytes	IDE / SATA controller, PCI
01F0 – 01F7	8 bytes	IDE / SATA controller, PCI
0200 – 020F	16 bytes	Reserved
0260 - 0267	8 bytes	Reserved
0268 – 026F	8 bytes	Touch panel for serial port
0270 – 0277	8 bytes	Reserved
0278 – 027F	8 bytes	Reserved
02F8 – 02FF	8 bytes	SERIAL B
0376	1 byte	IDE / SATA controller, PCI
03B0 – 03BB	13 bytes	Graphics
03C0 – 03DF	32 bytes	Graphics

Table 6.1. I/O Port Addresses *< 2 / 2 >*

Address	Size	Description
03F6	1 byte	IDE / SATA controller, PCI
03F8 – 03FF	8 bytes	SERIAL A
0400 – 043F	64 bytes	Power management
04D0 – 04D1	2 bytes	Interrupt controller
0500 – 053F	64 bytes	Reserved (GPIO)
0CF9	1 byte	Reset generator
0D00 – 0FFFF	62208 bytes	PCI bus

Interrupt Level List

Table 6.2. Hardware Interrupt Levels (Factory Settings)

Type	8259	Priority	Description	Vector
NMI		High	-I/O CHK	02H
IRQ0	MASTER	↑	Timer 0	08H
IRQ1	"	│	System reserved	09H
IRQ2	"	│	Interrupt controller 2 (slave)	0AH
IRQ8	SLAVE	│	Real-time clock	70H
IRQ9	"	│	System reserved	71H
IRQ10	"	│	Touch panel for serial port	72H
IRQ11	"	│	System reserved	73H
IRQ12	"	│	System reserved	74H
IRQ13	"	│	Co-processor	75H
IRQ14	"	│	Not in use (Available for users)	76H
IRQ15	"	│	Not in use (Available for users)	77H
IRQ3	MASTER	│	Serial port B (COM B)	0BH
IRQ4	"	│	Serial port A(COM A)	0CH
IRQ5	"	│	System reserved	0DH
IRQ6	"	↓	Not in use (Available for users)	0EH
IRQ7	"	Low	System reserved	0FH

POST Codes

Table 6.3. POST Codes *< 1 / 3 >*

POST (hex)	Description
< Security (SEC) phase >	
1h	Power on. Reset type detection (hard/soft)
2h	AP initialization before loading microcode
3h	North Bridge initialization before loading microcode
4h	South Bridge initialization before loading microcode
5h	OEM initialization before loading microcode
6h	Loading microcode
7h	AP initialization after loading microcode
8h	North Bridge initialization after loading microcode
9h	South Bridge initialization after loading microcode
Ah	OEM initialization after loading microcode
Bh	Cache initialization
< Pre-EFI Initialization (PEI) phase >	
10h	PEI Core is started
11h	Pre-memory CPU initialization is started
12h – 14h	Pre-memory CPU initialization (CPU module specific)
15h	Pre-memory North Bridge initialization is started
16h – 18h	Pre-memory North Bridge initialization (North Bridge module specific)
19h	Pre-memory South Bridge initialization is started
1Ah – 1Ch	Pre-memory South Bridge initialization (South Bridge module specific)
1Dh – 2Ah	OEM pre-memory initialization codes
2Bh	Memory initialization: Serial Presence Detect (SPD) data loading
2Ch	Memory initialization: Memory detection
2Dh	Memory initialization: Programming memory timing information
2Eh	Memory initialization: Configuring memory
2Fh	Memory initialization: Other
30h	Reserved for ASL (see ACPI/ASL Checkpoints)
31h	Memory installed
32h	CPU post-memory initialization is started
33h	CPU post-memory initialization: Cache initialization
34h	CPU post-memory initialization: Application Processor(s) (AP) initialization
35h	CPU post-memory initialization: Boot Strap Processor (BSP) selection
37h	CPU post-memory initialization: System Management Mode (SMM) initialization
38h	Post-memory North Bridge initialization is started
39h – 3Ah	Post-memory North Bridge initialization (North Bridge module specific)
3Bh	Post-memory South Bridge initialization is started
3Ch – 3Eh	Post-memory South Bridge initialization (South Bridge module specific)
3Fh – 4Eh	OEM post-memory initialization codes
4Fh	DXE IPL is started
< Driver Execution Environment (DXE) phase >	
60h	DXE Core is started
61h	NVRAM initialization
62h	South Bridge Runtime Services are installed
63h	CPU DXE installation is started
64h-67h	CPU DXE installation is started (CPU module specific)
68h	PCI Host Bridge is installed

Table 6.3.　POST Codes　*< 2 / 3 >*

POST (hex)	Description
69h	North Bridge DXE initialization is started
6Ah	North Bridge DXE SMM initialization is started
6Bh - 6Fh	North Bridge DXE initialization (North Bridge module specific)
70h	South Bridge DXE initialization is started
71h	South Bridge DXE SMM initialization is started
72h	South Bridge device initialization
73h – 77h	South Bridge DXE initialization (South Bridge module specific)
78h	ACPI module initialization
79h	CSM initialization
7Ah – 7Fh	Reserved for future AMI DXE codes
80h – 8Fh	OEM DXE initialization codes
90h	Boot Device Selection (BDS) phase
91h	Driver connection is started
92h	PCI bus initialization is started
93h	PCI bus hot plug controller initialization
94h	PCI bus number enumeration
95h	PCI bus resource request
96h	PCI bus resource assignment
97h	Console output device connection
98h	Console input device connection
99h	Super IO initialization
9Ah	USB initialization is started
9Bh	USB reset
9Ch	USB detection
9Dh	USB enabled
9Eh – 9Fh	Reserved for future AMI codes
A0h	IDE initialization is started
A1h	IDE reset
A2h	IDE detection
A3h	IDE enabled
A4h	SCSI initialization is started
A5h	SCSI reset
A6h	SCSI detection
A7h	SCSI enabled
A8h	Password confirmation setup
A9h	Setup is started
AAh	Reserved for ASL (see ACPI/ASL Checkpoints)
ABh	Setup input wait
ACh	Reserved for ASL (see ACPI/ASL Checkpoints)
ADh	Ready to boot event
AEh	Legacy boot event
AFh	Boot service event is finished
B0h	Virtual address map runtime settings are started
B1h	Virtual address map runtime settings are finished
B2h	Legacy option ROM initialization
B3h	System reset
B4h	USB hot plug
B5h	PCI bus hot plug
B6h	Clean-up of NVRAM
B7h	Configuration reset (Resetting the NVRAM settings)
B8h - BFh	Reserved for future AMI codes
C0h - CFh	OEM BDS initialization codes

Table 6.3.   POST Codes   *< 3 / 3 >*

POST (hex)	Description
ACPI/ASL Checkpoints	
01h	System is entering the S1 sleep state
02h	System is entering the S2 sleep state
03h	System is entering the S3 sleep state
04h	System is entering the S4 sleep state
05h	System is entering the S5 sleep state
10h	System is restored from the S1 sleep state
20h	System is restored from the S2 sleep state
30h	System is restored from the S3 sleep state
40h	System is restored from the S4 sleep state
ACh	System has migrated into ACPI mode. Interrupt controller is in PIC mode.
AAh	System has migrated into ACPI mode. Interrupt controller is in APIC mode.

SERIAL I/O Address and Register Function

The following table lists the I/O addresses in case of SERIAL A.

Table 6.4.　I/O Address

I/O address	DLAB	Read/Write	Register	
03F8H	0	W	Transmitter holding register	THR
		R	Receive buffer register	RBR
	1	W	Divisor latch register (LSB)	DLL
03F9H	1	W	Divisor latch register (MSB)	DLM
	0	W	Interrupt enable register	IER
03FAH	X	R	Interrupt ID register	IIR
03FBH	X	W	Line control register	LCR
03FCH	X	W	Modem control register	MCR
03FDH	X	R	Line status register	LSR
03FEH	X	R	Modem status register	MSR
03FFH	X	R/W	Scratch register	SCR

DLAB (Divisor Latch Access Bit)：The value in bit 7 of the line control register.

Table 6.5.   Function of Each Register   < 1 / 4 >

I/O address	Description
03F8H	THR: Transmitter Holding Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← ... → bit0 LSB Register dedicated to write transmitted data to
03F8H	RBR: Reciever Buffer Register [DLAB=O] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← ... → bit0 LSB Register dedicated to read received data from
03F8H	DLL: Divisor Latch (LSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← ... → bit0 LSB Baud rate setting register (LSB)
03F9H	DLH: Divisor Latch (MSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← ... → bit0 LSB Baud rate setting register (MSB)
03F9H	IER: Interrupt Enable Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 0 0 0 0 EMS ELSI ETHREI ERDAI Received data Interrupt enable Received data register empty Interrupt enable Receiver line status Interrupt enable Modem status interrupt enable [Always used at 0.] 1: Enable interrupt 0: Disable interrupt

Table 6.5.   Function of Each Register   *< 2 / 4 >*

I/O address	Description
03FAH	IIR : Interrupt Identification Register
03FBH	LCR : Line Contror Regester

For 03FAH (IIR):

bit2	bit1	bit0	Priority	Description
0	0	1	——	Interrupts are not generated.
1	1	0	1 (high)	Generated by overrun, parity, framing error or break interrupt. Cleared when the line status register is read.
1	0	0	2	Generated when the receive buffer register is ready. Cleared when the receiving buffer is read.
0	1	0	3	Generated when the transmitter holding register is empty. Cleared when the IIR is read or when transmitted data is written to THR.
0	0	0	4 (low)	Modem status interrupt is generated. (CTS, DSR, RI, CD) Cleared when the modem status register is read.

For 03FBH (LCR):

D1	D0	Bit table
0	0	5
0	1	6
1	0	7
1	1	8

0 : 1 STOP bit
1 : 1.5 STOP bits at 5-bit length
    2 STOP bits at 6-, 7-, or 8-bit length

0 : Disable parity
1 : Enable parity

0 : Odd parity
1 : Even parity

0 : Disable stick parity
1 : Enable stick parity

0 : Break signal off
1 : Send break signal

DLAB (Divisor Latch Access Bit)
In order to access the divisor latch register, you need to set the bit to 1. To access another register, set the bit to 0.

Table 6.5.   Function of Each Register   < 3 / 4 >

I/O address	Description
03FCH	MCR: Modem Control Register
03FDH	LSR: Line Status Regester

03FCH — MCR: Modem Control Register

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	Loop	IRQ	X	RTS	DTR

DTR   0 : Inactive [HIGH]
1 : Active [LOW]

RTS   0 : Inactive [HIGH]
1 : Active [LOW]

Interrupt control bit
0 : Disable
1 : Enable

Diagnostic local loop-back test
0 : Disable
1 : Enable

03FDH — LSR: Line Status Regester

D7	D6	D5	D4	D3	D2	D1	D0
0	TEMT	THRE	BI	FE	PE	OE	DR

Data ready
(1 for existence of received data)

Overrun error
(1 for occurrence of an error)

Parity error (1 for occurrence of an error)

Framing error (1 for occurrence of an error)

Break interrupt (1 for detection of break state)

Transmitter holding register empty
(1 for transmission buffer being empty)

Transmitter empty
(Set to 1 when both transmitter holding register and transmitter shift register are empty.)

Table 6.5.   Function of Each Registe   *< 4 / 4 >*

I/O address	Description
03FEH	MSR : Modem Status Register D7　D6　D5　D4　D3　D2　D1　D0 DCD｜RI｜DSR｜CTS｜DDCD｜TERI｜DDSR｜DCTS └─Delta CTS └─Delta DSR └─Trailing edge RI └─Delta data carrier detect └─CTS └─DSR └─RI └─DCD
03FFH	SCR : Scratchpad Register 　　This is an 8-bit, readable/writable register which is available to the user to 　　allow data to be saved temporarily.

Baud Rate Settings

A baud rate is set by software by dividing the clock input (1.8432MHz). The baud rate in terms of hardware can be set to a maximum of 115,200 bps for SERIAL A, B. The baud rates available in practice depend on the operating environment (cable, software, etc.). The table below lists typical baud rates and their respective values to be written to the divisor latch register (LSB, MSB).

Table 6.6.   Baud Rate Settings

Baud rate to be set	SERIAL A, B Clock input (1.8432MHz)	
	Value to be set in the divisor register (Decimal)	Setting error (%)
50	2304	---
75	1536	---
110	1047	0.026
134.5	857	0.058
150	768	---
300	384	---
600	192	---
1200	96	---
1800	64	---
2000	58	0.69
2400	48	---
3600	32	---
4800	24	---
7200	16	---
9600	12	---
14400	8	---
19200	6	---
28800	4	---
38400	3	---
57600	2	---
76800	---	---
115200	1	---
153600	---	---
230400	---	---

Example: To set 9,600 bps, write "00" to the (MSB) divisor latch register and "12 (decimal)" to the (LSB) divisor latch register.

Watch-Dog-Timer

The watchdog timer serves as a safeguard against possible system lock-up in your industrial computer system. In most industrial environments, there are heavy equipment, generators, high-voltage power lines, or power drops that have adverse effects on your computer system. For instance, when a power drop occurs, it could cause the CPU to come to a halt state or enter into an infinite loop, resulting in a system lock-up.
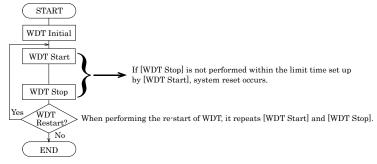
The application software created by user with the watchdog timer enabled, a RESET automatically generated unless the software periodically triggers the timer within the setting time-out interval. That is, while the system gets hung up, the running program can't trigger the timer periodically. The timer will generate a reset signal to reboot the system. This feature allows a running program to restart in an orderly way when a power glitch or any abnormal condition occurs.

The watchdog timer comes with 255-level time-out interval, 1 - 255 seconds per interval, which can be adjusted by software setting. There is a tolerance of 2 second for this time-out interval. For example, if the time-out interval has been set to 32 seconds, your program should trigger the watchdog timer before 28 seconds are escaped. Otherwise, after 28 - 32 seconds are escaped, the system will automatically reboot. To keep the system running normally, your program should trigger the watchdog timer every 28 seconds.

The I/O port is defined at address 2e/2fH. You can trigger enable / disable the timer by writing address 2e/2fH.

Here is an example for flow chart and programming how to use the watch-dog-timer.

(1) Example flow chart

```
       ( START )
           │
     ┌─ WDT Initial ─┐
     │               │
     ├─ WDT Start ─┐
     │             }──→  If [WDT Stop] is not performed within the limit time set up
     ├─ WDT Stop ──┘      by [WDT Start], system reset occurs.
     │
 Yes WDT
 ←─ Restart?      When performing the re-start of WDT, it repeats [WDT Start] and [WDT Stop].
       │ No
     ( END )
```

*   It is also possible not to perform [WDT Stop] instead of performing [WDT Stop] to [WDT Start], but to perform [WDT Start] continuously at the time of a re-start.

(2) Example programming

The following example is written in Intel8086 assembly language.

```
;==============
;<WDT Initial>
;==============
;----------------------------------------
;Enter the extended function mode
;----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;---------------------------------
;Set WDT function at pin89
;---------------------------------
MOV DX,2EH
MOV AL,2BH
OUT DX,AL
MOV DX,2FH
MOV AL,0DH
OUT DX,AL
;---------------------------------------------
;Select logical device WDT(number 8)
;---------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-----------------------------------------------
;Activate logical device WDT(number 8)
;-----------------------------------------------
MOV DX,2EH
MOV AL,30H
OUT DX,AL
MOV DX,2FH
MOV AL,01H
OUT DX,AL
;---------------------------------
;Set timer unit : second
;---------------------------------
MOV DX,2EH
MOV AL,F5H
OUT DX,AL
MOV DX,2FH
MOV AL,00H
OUT DX,AL
;----------------------------------------
;Exit the extended function mode
```

```
;----------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL


;=============================
;<WDT START : counter set and a start >
;=============================
;---------------------------------------------
;Enter the extended function mode
;---------------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-----------------------------------------------
;Select logical device WDT(number 8)
;-----------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;----------------------------------------------------
;Set time of WDT and start to count down
;----------------------------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;------------------------------------------------------------------------------
;The data of an example is 15 seconds.(01H=1sec.- FFH=255sec.)
MOV AL,0FH     ; 0FH = 15Sec.
;------------------------------------------------------------------------------
OUT DX,AL
;----------------------------------
;Exit the extended function mode
;----------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL


;=============
;<WDT STOP>
;=============
;----------------------------------
;Enter the extended function mode
;----------------------------------
MOV DX,2EH
MOV AL,87H
```

```
    OUT DX,AL
    OUT DX,AL
;----------------------------------
;Select logical device WDT(number 8)
;----------------------------------
    MOV DX,2EH
    MOV AL,07H
    OUT DX,AL
    MOV DX,2FH
    MOV AL,08H
    OUT DX,AL
;----------------------------------
;Stop count down of WDT
;----------------------------------
    MOV DX,2EH
    MOV AL,F6H
    OUT DX,AL
    MOV DX,2FH
;----------------------------------
;The data of 00H is stop WDT
    MOV AL,00H
;----------------------------------
    OUT DX,AL
;----------------------------------
;Exit the extended function mode
;----------------------------------
    MOV DX,2EH
    MOV AL,AAH
    OUT DX,AL
```

⚠ CAUTION

The timer's intervals have a tolerance of ±2 seconds.

Status LED

The operation of the status LED can be controlled from user applications.

The following is a sample program created in an MS-DOS environment with MSC version 8.03.

This program makes the status LED blink once per second for approximately 10 seconds.

```c
#include <stdio.h>
#include <time.h>
#include <dos.h>
#include <io.h>


#define  IDX                 0x2e
#define  DAT                 IDX+1
#define  IOWAIT     outp( 0xed, 0x00 )


/* READ WD83627 CR */
int      get_reg( int adr )
{
        IOWAIT;
        outp( IDX, adr );
        IOWAIT;
        return inp( DAT );
}

/* WRITE WD83627 CR */
void set_reg( int adr, int dat )
{
        IOWAIT;
        outp( IDX, adr );
        IOWAIT;
        outp( DAT, dat );
}

/* WD83627 SET LOGICAL DEV */
void set_ldev( int dev )
{
        set_reg( 7, dev );
}

/* OPEN WD83627 CR */
void open_dev( void )
{
        IOWAIT;
        outp( IDX, 0x87 );
        IOWAIT;
        outp( IDX, 0x87 );
}

/* CLOSE WD83627 CR */
```

```
void close_dev( void )
{
        IOWAIT;
        outp( IDX, 0xaa );
}

int     main( int argc, char *argv[] )
{
        time_t          otm,rtm, rtm2;

        open_dev();

        set_ldev( 9 );
        set_reg( 0x30, get_reg(0x30) | 0x08 );  // Enable GPIO5x
        set_reg( 0xe0, get_reg(0xe0) & 0xdf );  // GPIO55(SLED) output
        set_reg( 0xe1, get_reg(0xe1) & 0xdf );  // GPIO55(SLED) OFF

        otm=rtm=rtm2=time(&rtm);

        while( (otm+10)>rtm ){
                    rtm=time(&rtm);
                    if( rtm != rtm2 ){
                                rtm2 = rtm;
                                if( rtm%2 ){
                                set_reg( 0xe1, get_reg(0xe1) | 0x20 );   // GPIO55(SLED) ON
                                }
                                else{
                                set_reg( 0xe1, get_reg(0xe1) & 0xdf );  // GPIO55(SLED) OFF
                                }
                    }
        }

        close_dev();

}
```

Battery

Battery Specification

This product uses the following battery.

- Type : Lithium primary battery
- Model : BR-1/2AA
- Maker : Panasonic
- Nominal voltage : 3V
- Nominal capacity : 1000mAh
- Lithium content : 1g or less

Removing the battery
Remove the battery according to the following figure.

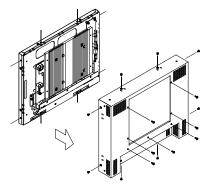(1) Remove the screws on the back and remove the back cover.

Figure 6.2.   Removing the battery 1

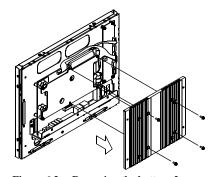(2) Remove the screws fixing the heatsink and remove the heatsink.

Figure 6.3.   Removing the battery 2

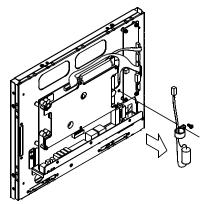(3) Remove the screws fixing the battery and remove the battery.

Figure 6.4.   Removing the battery 3

Disposing the battery

Dispose the removed battery properly as instructed by local government.

7. List of Options

AC adapter

- IPC-ACAP12-04   : AC adapter (Input: 100-240VAC, Output: 12VDC 4A)

⚠ CAUTION ─────────────────────────────────────

When you use this AC adapter with PT955S, the current consumption of USB + 5VDC should be 1.0A or less for four ports in total.

Screen protective sheets

- IPC-CV12   : 12.1-inch screen protective sheets (10 sheets)
- IPC-CV15   : 15-inch screen protective sheets (10 sheets)

⚠ CAUTION ─────────────────────────────────────

Note that the sheets may not protect the screen because it is a few millimeters smaller than the screen size.

Protective sheets		PT-955SxX Series	
Model	Sheet size (mm)	Model	Sheet size (mm)
IPC-CV12	250.0 x 188.0	PT-955SLX-DC6xxx	358.0 x 289.0
IPC-CV15	308.0 x 232.0	PT-955SHX-DC6xxx	309.0 x 253.0

CFast Card

- CFS-4GB-A   : CFast Card 4GB
- CFS-8GB-A   : CFast Card 8GB

Other option

- IPC-SND-03   : Desk stand (Only PT-955SLX-DC6xxx)

Additional TFT color LCD

<LVDS&DVI input type >
- FPD-H71XT-DC1 *1 :15 inch 1024 x 768 dots, Panel mounted type
- FPD-L71ST-DC1 *1 :12.1 inch 800 x 600 dots, Panel mounted type
- FPD-S71VT-DC1 *1 : 6.4 inch 640 x 480 dots, Panel mounted type
- FPD-H75XT-DC1 *1 : 15 inch 1024 x 768 dots, Embedded type
- FPD-L75ST-DC1 *1 : 12.1 inch 800 x 600 dots, Embedded type
- FPD-M75VT-DC1 *1 : 10.4 inch 640 x 480 dots, Embedded type

*1 Please purchase the optional connection cable [IPC-DVI/D-020, IPC-DVI/D-050].

< Analog RGB input type >
- FPD-H21XT-AC : 15 inch 1024 x 768 dots, Panel mounted type
- FPD-L21ST-AC : 12.1 inch 800 x 600 dots, Panel mounted type
- FPD-M21VT-AC : 10.4 inch 640 x 480 dots, Panel mounted type

Display cable only for DVI input
- IPC-DVI/D-020 : DVI-D Cable (2m)
- IPC-DVI/D-050 : DVI-D Cable (5m)

⚠ CAUTION

Precautions when using products other than our options
- If a product other than our option is used, the normal operation may be impaired or the functions may be limited.

Precautions when Using Additional Display
- An additional display can be used to enable simultaneous screen display with the PANEL-PC main display.
- If the resolution of the additional display is different from that of the PANEL-PC main display, the size of screen images on the additional display will be decreased or increased with lower image quality.
- When using the main unit and touch panel function at the same time, use a USB connection for the touch panel.

* Check the CONTEC's Web site for the latest information on these options.

PT-955S Series

User's Manual

PT-955SLX-DC6000
PT-955SLX-DC6311
PT-955SLX-DC6312
PT-955SHX-DC6000
PT-955SHX-DC6311
PT-955SHX-DC6312